

GENERAL INFORMATION	
Name: Diane King	Phone #: 77021
Course Prefix/Number: ETI3704	Course Title: Industrial Safety in Electronics Engineering Technology
Number of Credits: 3	
Degree Type	<input type="checkbox"/> B.A. <input type="checkbox"/> B.S. <input checked="" type="checkbox"/> B.A.S <input type="checkbox"/> A.A. <input type="checkbox"/> A.S. <input type="checkbox"/> A.A.S. <input type="checkbox"/> C.C.C. <input type="checkbox"/> A.T.C. <input type="checkbox"/> V.C.C
Date Submitted/Revised: 02-18-2008	Effective Year/Term: 2009-2
<input checked="" type="checkbox"/> New Course Competency <input type="checkbox"/> Revised Course Competency	
Course to be designated as a General Education course (part of the 36 hours of A.A. Gen. Ed. coursework): <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
The above course links to the following Learning Outcomes: <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <input type="checkbox"/> Communication <input type="checkbox"/> Numbers / Data <input checked="" type="checkbox"/> Critical thinking <input checked="" type="checkbox"/> Information Literacy <input type="checkbox"/> Cultural / Global Perspective </div> <div style="width: 45%;"> <input type="checkbox"/> Social Responsibility <input type="checkbox"/> Ethical Issues <input checked="" type="checkbox"/> Computer / Technology Usage <input type="checkbox"/> Aesthetic / Creative Activities <input checked="" type="checkbox"/> Environmental Responsibility </div> </div>	
Course Description (limit to 50 words or less): This course is designed to teach students principles of safety in typical industrial electronics and manufacturing environments. Students will learn analysis and design of safety programs for industry, with emphasis on the occupational safety and health act (OSHA), the National Electrical Code, and Materials Safety Data Sheets (MSDS). (3 hr. lecture)	
Prerequisite(s): none	Co requisite(s):

Course Competencies:

Competency 1: The student will demonstrate an understanding of industrial safety practices and procedures by:

1. Identifying hazardous situations that exist in industrial electronics and manufacturing environments.
2. Identifying situations that require the use of protective equipment, explaining what type of equipment to use, and demonstrating the proper methods for wearing or using protective equipment, including:
 - a. hard hats
 - b. safety glasses, goggles, and face shields
 - c. ear plugs
 - d. safety shoes and boots
 - e. electrical protection equipment (rubber gloves, rubber boots)

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- f. nonsparking tools
 - g. respirators
 - h. self-contained breathing apparatus
 - i. chemical handling clothing and equipment
 - j. high-temperature clothing and equipment
3. Describing safe work practices around hazards that may include working in or near:
- a. high-voltage areas, energized equipment, or electrical panels
 - b. rotating equipment
 - c. an abnormal temperature environment (e.g., areas susceptible to heat stress)
 - d. the vicinity of moving heavy loads
 - e. high-noise areas
 - f. adverse environmental conditions (e.g., rain, heavy winds)
 - g. activities that generate airborne dust, debris, and particles
 - h. an abnormal pressure environment
 - i. welding, machining, and grinding activities
 - j. radiologically controlled areas (e.g., radiation or high-radiation areas, contaminated areas, radiological containments)
 - k. work being performed overhead
4. Discussing safe work practices and the consequences of not following sound practice when working with or on:
- a. hazardous or explosive chemicals and other hazardous materials, compressed gases, high-temperature or high-pressure equipment
 - b. freeze seals
 - c. divers performing tasks in tanks and near intake and discharge structures
 - d. asbestos materials
 - e. lead
 - f. components near or over water
5. Describing factors that may contribute to personal injury or radiological incidents and explaining how these factors affect the protection requirements

Competency 2: The student will demonstrate an understanding of industrial clearance/tagging procedures by:

1. Describing how safe work conditions are achieved and maintained by the positioning of plant components such as breakers, valves, and other devices. This covers verification of component positions, including the use of grounding or gagging devices.
2. Determining the adequacy of a tagged boundary and explain how to verify proper clearance tagging prior to commencing work on plant equipment.
3. Explaining individual responsibilities and limitations associated with working within a tagged boundary such as the operation of valves or components.
4. Explaining the hazards of not adhering to clearance tags such as personnel injury and equipment damage.

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5. Discussing lessons learned based on plant and industry experience where improper or inadequate implementation of the clearance/tagging program impacted the performance of maintenance jobs or caused personnel injuries.
6. Demonstrating the step-by-step procedure to initiate, place, and remove each type of clearance tag used at a site.

Competency 3: The student will demonstrate an understanding of electrical safety by:

1. Identifying common electrical safety hazards found in industrial electronics and manufacturing environments.
2. Describing electrical shock symptoms and demonstrating the proper response to an electrical shock victim.
3. Describing the station policies and precautions associated with installation and maintenance activities near or on energized electrical equipment.
4. Explaining procedures for discharging stored electrical energy.
5. Explaining the methods to determine when equipment is de-energized properly.
6. Defining the allowable approach distance to high-voltage energized circuits.
7. Explaining precautions relating to:
 - a. electrical lines embedded in earth and structures
 - b. overhead lines on site
8. Explaining the inspection requirements for commonly used electrical components (e.g., drop lights, extension cords, and hand-held power tools).
9. Identifying properly grounded tools, explaining the proper use of a ground-fault interrupter, identifying grounding hazards, and discussing ground fault isolation procedures and precautions.
10. Recognizing properly installed grounding straps.
11. Identifying the types of ladders acceptable for use near electrical circuits.
12. Discussing lessons learned, based on industry experience, where personal injury, a fatality, or equipment damage resulted when working on electrical systems and components.

Competency 4: The student will demonstrate an understanding of electrical hazards in industrial electronics and manufacturing environments by:

1. Defining electrical hazards.
2. Describing types of electrical hazards and their physiological effects on the human body. including:
 - a. electrical shock
 - b. electrical arc-flash
 - c. electrical arc-blast
 - d. combustible and explosive materials
 - e. lightning hazards
 - f. improper wiring

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- g. insulation
3. Identifying the sources of electrical hazards in laboratory, plant, and system installation environments.
 4. Describing preventive measures and methods to reduce electrical hazards.
 5. Discussing response and treatment to electrically-induced injuries.
 6. Locating and citing relevant sections of the National Electric Code (NEC) as they apply to electronic system development and implementation.
 7. Locating and citing relevant sections of the Occupational Safety and Health Administration (OSHA) standards that are applicable to electronic system development and implementation.

Competency 5: The student will demonstrate an understanding of the safety issues concerning chemicals, gases, and solvents by:

1. Describing the purpose and general requirements of chemical control programs.
2. Describing the labeling requirements for chemicals.
3. Identifying hazardous chemicals found at industrial sites and explaining associated precautions.
4. Describing the proper handling, storage, disposal methods, transportation, and use of chemicals, including environmental concerns.
5. Explaining the reasons for and methods of avoiding personal contamination with chemicals, including inhalation, ingestion, and skin absorption.
6. Explaining the reasons for avoiding chemical contamination of systems and components, including floor and equipment drains.
7. Describing the proper use of special protective equipment and emergency facilities for chemicals used on the job.

Competency 6: The student will demonstrate an understanding of fire hazards in industrial electronics and manufacturing environments by:

1. Defining fire hazards.
2. Distinguishing between classes of fire.
3. Discussing the sources of fire hazard.
4. Interpreting National Fire Protection Association (NFPA) color codes for identifying types of fire hazards.
5. Identifying the sources of fire hazards in laboratory, plant, and system installation environments.
6. Describing preventive measures and methods to reduce fire hazards.
7. Discussing response and treatment to fire-induced injuries.
8. Locating and citing relevant sections of the Occupational Safety and Health Administration (OSHA) standards that are applicable to electronic system development and implementation.

Competency 7: The student will demonstrate an understanding of the safety issues concerning working from heights and in confined spaces by:

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1. Describing the proper selection and application criteria for the following:
 - a. bucket trucks
 - b. ladders
 - c. safety belts, lines, and harnesses
 - d. scaffolds
2. Explaining the inspection and safety requirements prior to the use of each type of safety equipment.
3. Describing the following procedural requirements for controlling confined space access:
 - a. obtaining special permits required to work in confined spaces
 - b. isolating, draining, purging, and flushing the space prior to entry
 - c. ventilating the space prior to personnel entry
 - d. testing the atmosphere for oxygen, explosive gas, and toxic gas concentration
 - e. clearing internal obstructions that interfere with safety lines
 - f. identifying and correcting other hazards (e.g., slippery surfaces)
 - g. installing temporary lighting
 - h. maintaining visual and oral contact between the person inside and someone outside the confined space
4. Identifying the tools and equipment that may be taken into confined spaces.
5. Explaining personnel, tool, and equipment accountability.
6. Describing the use of safety equipment that may be used in confined spaces, emphasizing unique applications (e.g., special clothing, ice vests).
7. Explaining methods of maintaining and monitoring adequate temporary ventilation.
8. Explaining the danger of inert gases, such as nitrogen and argon, in confined spaces, low areas, and inadequately ventilated plant areas.
9. Discussing the lessons learned, based on plant and industry experience, where personal injuries, fatalities, and equipment damage have resulted working from heights and confined spaces.

Competency 8: The student will demonstrate an understanding of safe procedures for working with transportation equipment by:

1. Explaining the policy for use and control of transportation equipment used by maintenance personnel (e.g., speed limits, use of flagman while backing).
2. Identifying site areas with restricted vehicle access (e.g., security areas, electrical switchyards, storage areas).
3. Identifying vehicles designated to transport equipment.
4. Describing special safety precautions and equipment associated with each type of vehicle.
5. Describing the proper methods for securing vehicle loads.

Competency 9. The student will demonstrate an understanding of basic principles and practices of first aid and CPR by:

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1. Discussing plant situations in which emergency first aid and/or CPR may be required.
2. Citing the basic four rules of first aid.
3. Listing various artificial resuscitation techniques and practicing how to apply them.
4. Listing the three methods to control bleeding and practicing how to apply them.
5. Describing the symptoms of shock, how to prevent shock, and how to treat shock.
6. Differentiating between a simple and a compound fracture and describe emergency treatment for fractures.

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